

## Installation Instructions

# HP StorageWorks Modular Smart Array 1000 Small Business SAN



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HP StorageWorks MSA1000  
Small Business SAN Installation Instructions  
First Edition (November 2004)  
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A7450-96002

## Additional resources

### MSA1000

- MSA1000 web site (<http://www.hp.com/go/msa1000>)
- MSA1000 Documentation CD, shipped with the MSA1000
- MSA1000 printed documentation, shipped with the MSA1000

The MSA1000 web site includes the latest information about your MSA.

### 2/8q Fibre Channel Switch

- Small Business SAN and HA Documentation CD, shipped with the Small Business SAN kit

### Servers

- Server web site (<http://www.hp.com/go/servers>)

The HP Servers web site includes the latest information about HP servers.

### SAN Infrastructure

- SAN Infrastructure web site (<http://www.hp.com/go/san>)

The SAN Infrastructure web site includes information about HP Storage area Networks (SANs), switches, and Host Bus Adapters (HBAs).

**Note:** In addition to the other information available on the SAN Infrastructure web site, please navigate to and review the SAN Design Guide.

### High Availability

High availability refers to deployments that include redundant hardware components to ensure uninterrupted service.

- High Availability web site (<http://www.hp.com/go/ha>)
- Multi-pathing information for the Small Business SAN is available on the MSA1000 web site (<http://www.hp.com/go/msa1000>)

## Notes for HA Upgrade kits

- If you are installing a Small Business SAN kit and an HA Upgrade kit at the same time, or using an HA Upgrade kit to convert an existing MSA1000 Small Business SAN to a multi-path or clustered-server configuration, use this document to install the hardware and software components in the kit.
- Basic failover protection software is provided on the Small Business SAN Software CD and is installed on the server during the configuration process. Go to the MSA1000 web site (<http://www.hp.com/go/msa1000>) for more information about this basic failover protection.

## 1

### Prepare the site

To ensure continuous, safe, and reliable operation of your equipment, place your system in an approved environment, which includes:

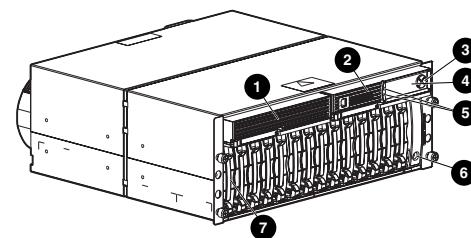
- Adequate clearance space around the rack, for access and servicing
  - Front of the rack: 25 inches
  - Back of the rack: 30 inches
- Adequate power sources, including uninterruptable power supplies
  - Input voltage: 100 to 240 VAC
  - Input frequency: 47 to 63 Hz
  - Maximum input current: 1.3 Amps
  - Maximum input power: 160 W
- Adequate operating temperature and humidity levels
  - Temperature: 50° F to 95° F (10° C to 35° C)
  - Humidity: 10% to 90%

## 2

### Unpack the kit(s)

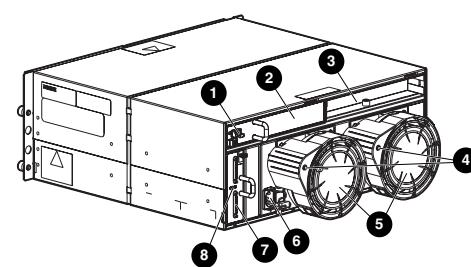
Unpack and inspect the contents of each kit.

#### MSA1000 features (front)



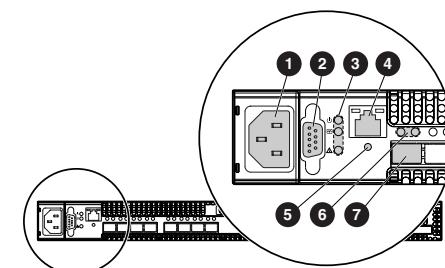
- ① Redundant controller blank
- ② Primary controller
- ③ Display push buttons
- ④ LED display panel
- ⑤ Status indicators
- ⑥ Power button
- ⑦ Hard drive slots

#### (rear)



- ① 2-Gb SFP transceiver
- ② Fibre Channel I/O module
- ③ Redundant I/O blank
- ④ Power supply indicators
- ⑤ Power supply fans
- ⑥ A/C power connector
- ⑦ SCSI expansion ports
- ⑧ Status indicators

#### 2/8q FC Switch features



- ① A/C power connector
- ② Serial maintenance port
- ③ Chassis indicators
- ④ Ethernet maintenance port
- ⑤ Maintenance mode button
- ⑥ Fibre Channel LEDs
- ⑦ Fibre Channel ports

## 3

### Optional, for HA Upgrade kits: Install redundant MSA1000 options

If you are installing an HA Upgrade kit, install the following items in the MSA1000:

- Redundant MSA1000 Controller
- Redundant Fibre Channel I/O Module

For installation instructions, refer to the documents included with the option kits.

**Note:** A redundant switch and additional HBAs are included in the HA Upgrade kit. Follow these instructions and install these items when prompted.

## 4

### Rack the devices

Use the following instructions to rack both the MSA1000 and the 2/8q FC Switch.

- Mount all devices with the port-side facing the rear of the rack.
- Install hard drives after racking the MSA1000.
- Use appropriate caution when handling heavy items.
- Locate the heaviest items, such as uninterruptable power supplies, additional storage enclosures, and the MSA1000 near the bottom of the rack.

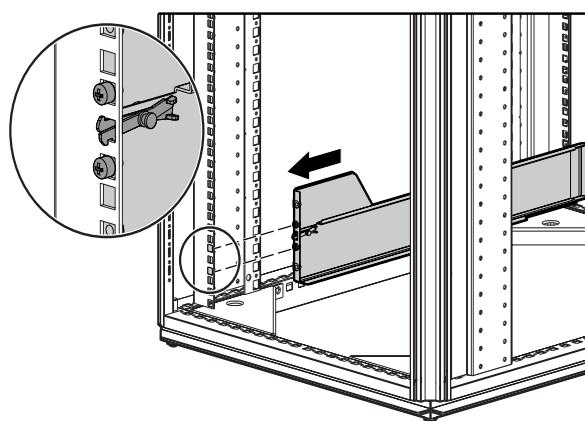
#### 1. Mark the holes for the rails on the front and the back of the rack.

Use the Universal 4U template for the MSA1000, and use the Universal 2U template for the 2/8q FC Switch.

#### 2. Install the rails for the MSA1000.

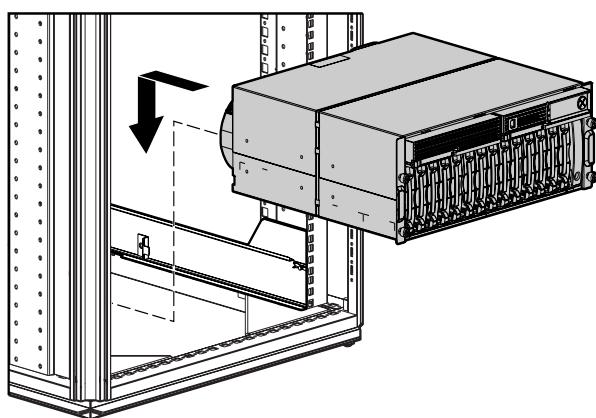
*From the front of the rack*, install the Universal 4U rails, verifying that the pins on the front and back of the rails extend through the marked holes, and the scissor-type locking latches engage.

**Note:** If the holes in the rack are round instead of square, remove the standard pins from the rails and replace them with the provided round-hole pins.



#### 3. Rack the MSA1000.

Remove the bezel from the front of the MSA1000, and then, *from the front of the rack*, slide the device onto the rails until the flanges on the device are flush with the front of the rack. Secure the thumbscrews on the flanges to the rack, and then re-attach the bezel to the front of the device.

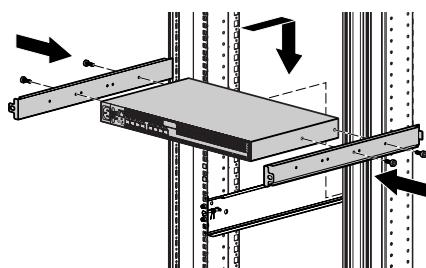


#### 4. Install the rails for the 2/8q FC Switch.

*From the rear of the rack*, install the Universal 2U rails, verifying that the pins on the front and the back of the rails extend through the marked holes, and the scissor-type locking latches engage.

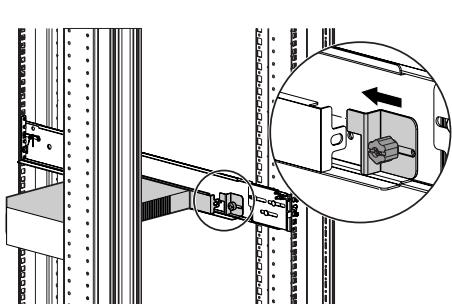
#### 5. Rack the 2/8q FC Switch.

Use four of the provided screws to attach the switch mounting adapter brackets to the sides of the switch, so that the port-side of the switch faces the front flanges of the brackets. Then, *from the rear of the rack*, slide the assembly onto the rails until the flanges on the brackets are flush with the rear of the rack. Use the remaining provided screws to secure the flanges to the rack.



**Note for HA Upgrade kits:** Rack the redundant switch.

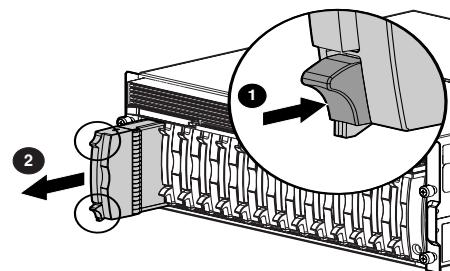
#### 6. For each device, move the rail retaining brackets from the far edge of the rails to a position where they connect with the back of the device, and then tighten the thumbscrews on the brackets to secure them.



## 5

### Install the hard drives

#### 1. Remove the hard drive blanks from the drive bays in the MSA1000.

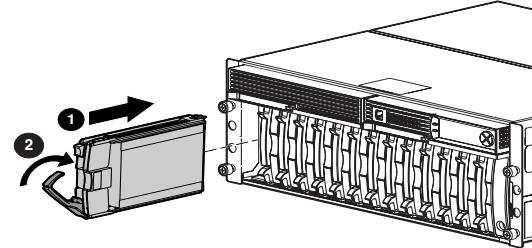


**Note:** Remove blanks only from bays in which you are installing hard drives. For proper airflow and cooling, blanks must remain in any unused bays.

#### 2. On the hard drive to be installed, press the ejector button and pivot the lever to a full open position.

#### 3. Insert the hard drive into the vacant drive bay ①.

With the ejector lever in the full open position, press firmly on the front of the hard drive to seat the drive in the bay.



#### 4. Close the ejector lever against the front of the drive ②.

### Server management best practices

- Before you install the HBA in the server, verify that the server is operating properly. Follow instructions shipped with your server and operating system.
- In Windows environments, be sure to install all operating system updates and patches. A recently released update which supports multi-pathing failover (MPIO) must be installed, before proceeding with this installation. Go to the Microsoft web site ([www.microsoft.com](http://www.microsoft.com)) to obtain this update.
- If more than one server will access the MSA1000, consider one of the servers a management server, from which you will perform most tasks.
- In a clustered or multi-path configuration, install Small Business SAN management software, such as the MPIO failover software and Array Configuration Utility (ACU), on each server, even if you will perform most tasks from a specific server.

## 6

### Install the HBAs

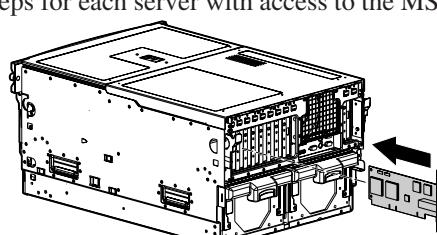
**Note:** If the server is not yet installed and configured, do so at this time. Follow the instructions included with the server and the operating system.

The HBA (Host Bus Adapter) is used to connect cables from the server to the switch, whose cables then connect to the MSA1000.

One or more HBAs must be installed in each server that will access the MSA1000. Simple, single-path configurations need only one HBA in each server, while redundant, multi-path environments require two HBAs in each server.

Installation procedures vary by server, but sample procedures are summarized below:

1. Shut down and remove power from the server.
2. Remove the server cover.
3. Identify the PCI bus slot to use, and then remove the cover blank for that slot.
4. Place the HBA in the slot, pressing on the HBA board until seated.
5. Secure the HBA to the chassis.
6. Replace the server cover.
7. Repeat these steps for each server with access to the MSA1000.



**Note:** Do not install an HBA driver on the server at this time. Drivers are included on the Small Business SAN Software CD, and are installed in Step 10.

## 7

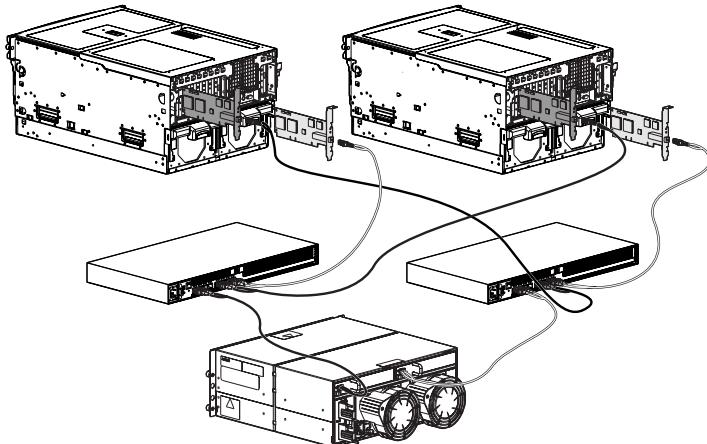
### Connect the cables

Connect the provided Fibre Channel cables between the HBA in the server and the switch, and between the switch and the Fibre Channel I/O module of the MSA1000.

**Note:** Serial or Ethernet cables are not required during this initial configuration.

**Note:** Do not yet connect power cables to the devices.

- Use appropriate care when handling Fibre Channel cables: do not touch the end of a Fibre channel cable, do not coil or bind Fibre Channel cables tightly, and be sure to support installed Fibre Channel cables, so that no excess weight is placed on the connectors.
- Gather the cables in the rear of the rack to ensure that the cabling in the back of the rack system does not interfere with system operation or maintenance. Bind the cables loosely with cable ties and route the excess cables out of the way, along the side of the rack.
- Attach a label near both ends of each cable to identify the device connected to that cable.
- Use colorful markers to color-code both ends of each cable, to help visually identify a particular cable without having to read or locate the label.
- In redundant configurations, loosely bind the matching pair of cables connecting the redundant devices.



Sample multi-path configuration, including both the Small Business SAN kit and the HA Upgrade kit. Includes two servers and two switches accessing an MSA1000 with two controllers and two Fibre Channel I/O modules.

## 8

### Power on the components

**NOTE:** Storage systems must be powered-on using the following specific sequence.

1. Connect the power cables and apply power to each Uninterruptable Power Supply (UPS).
2. Connect the power cables and apply power to each 2/8q FC switch.
3. Connect the power cables and apply power to any additional (optional) external storage enclosures.
4. Connect the power cables to the MSA1000 and start up the MSA by pressing the power button on the front panel.
5. Wait (up to four minutes) for the MSA1000 start-up routine to complete and the following message to be displayed on the LCD panel of the MSA:

MSA1000 Startup Complete

**Note for HA Upgrade kits:** If a redundant controller and Fibre Channel I/O module are installed in the MSA, the CLONE FIRMWARE message may be displayed on the controller. Press ">" to copy the firmware from one controller to the other.

6. Apply power to the servers with access to the MSA, start the operating systems, and log on as a user with administrative control.
7. Verify that each component in the SAN is operating properly.

- View the LED indicators on each component and look for irregular illuminations.
- Press the display push buttons on the front of the MSA and look for the following messages:

MSA1000 Startup Complete

Fibre Sub-System Link Failure  
(because the HBA driver is not yet installed, can be ignored)

Array controller firmware ver <version>

## 9

### Record system information

Locate the System information panel on this document and record important information about the devices in your SAN. Information requested in this form is helpful for multi-pathing, future configuration changes, and troubleshooting. When using the Small Business SAN Wizard, information is displayed on the MSA1000 LCD panel and in a window behind the Wizard.

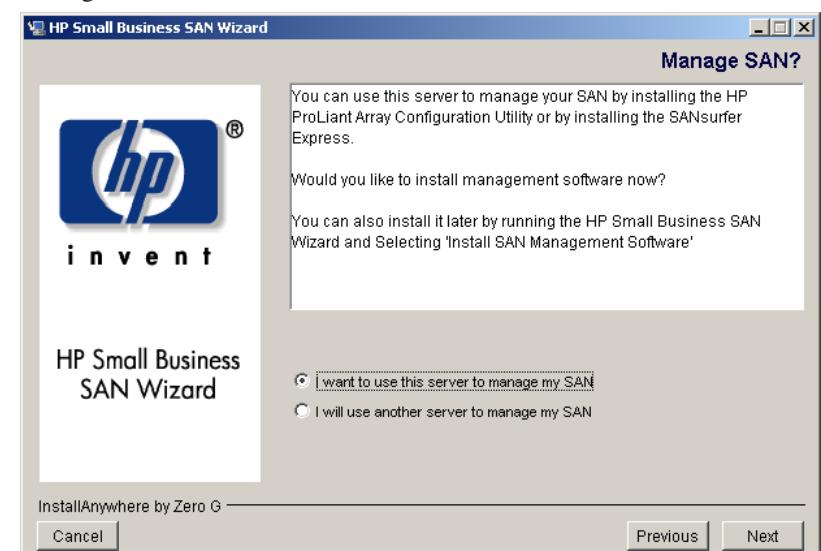
## 10a

### Configure the SAN: Windows

The MSA1000 Small Business SAN kit comes with an installation wizard, allowing you to configure the switch, the HBAs, and the MSA1000 storage.

Although other configuration methods are provided in the shipping carton with the MSA1000, HP recommends using the method described in this document.

1. Locate the Small Business SAN Software CD and insert it into the CD-ROM drive of the server.
  2. In the Welcome window, click **Next**.
- Several windows may be displayed, while the HBA driver and some additional software components are installed.
- Note:** A recent operating system update that supports multi-pathing is required for this installation. If this update is not found on the server, the Installation Wizard will prompt you to load it at this time.
3. When prompted, restart the server.
  4. In the Attach Storage window, click **Show SAN** to view a display of all currently connected devices.
- Use the information in this display to verify the connectivity of your devices. Specifically, verify connectivity to the MSA1000.
5. If the MSA1000 is not detected, check all cable connections between the server, the switch, and the MSA1000.
  6. In the Manage SAN window, indicate whether you want to install storage configuration tools on this server.



## 10b

### Configure the SAN: Linux

The MSA1000 Small Business SAN kit comes with an installation script, allowing you to configure the switch, the HBAs, and the MSA1000 storage.

Although other configuration methods are provided in the shipping carton with the MSA1000, HP recommends using the method described in this document.

1. Locate the Small Business SAN Software CD and insert it into the CD-ROM drive of the server.
- The CD automatically mounts and executes an installation script. If the CD does not auto-mount, mount the CD and execute the Small Business Linux Wizard script from the /Linux directory. (`install_smb`)
2. Follow the onscreen instructions to complete the script.
  3. Configure the storage.

To start the ACU, do one of the following:

- At the MSA1000 CLI prompt, enter: `cpqacuxe`.
- At the Netscape browser, enter `http://servername:2301`, where `servername` is the name or IP address of the server.

**Note:** When configuring the storage, be sure to identify the operating system of each Linux HBA connected to the MSA1000. For assistance, use the following resources:

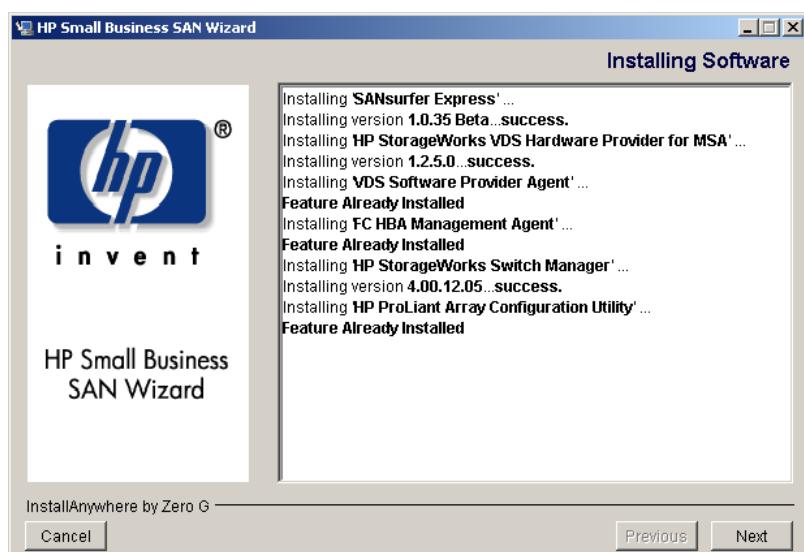
- Online help
- User guides - provided on the Small Business SAN Documentation CD

6. If you choose to not install the configuration tools on this server, but instead want to exit the installation process, proceed to step 8.

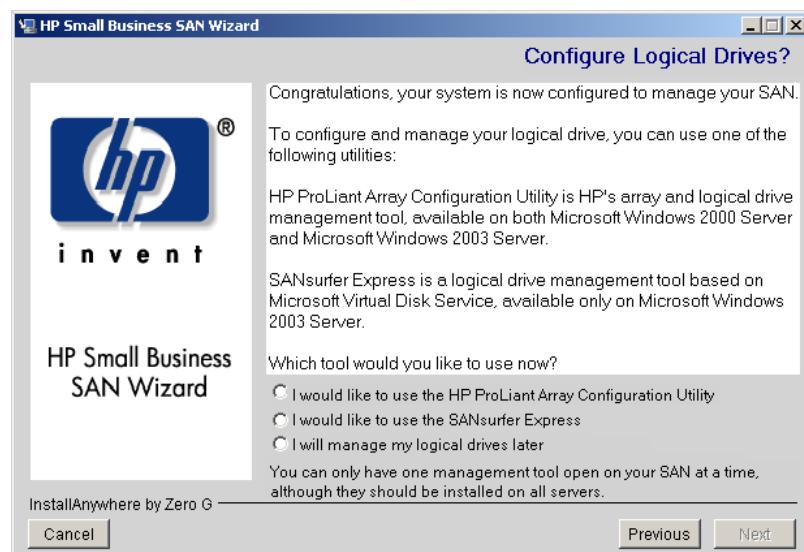
If you choose to install the configuration tools on this server, an installation wizard and some additional windows are displayed.

Click **Next** when prompted, to proceed with the installation.

The following Installing Software image is displayed in the background during the installation process.



7. In the Configure Logical Drives window, select the utility you want to use. If you are not prepared to configure the storage at this time, select the "later" option.

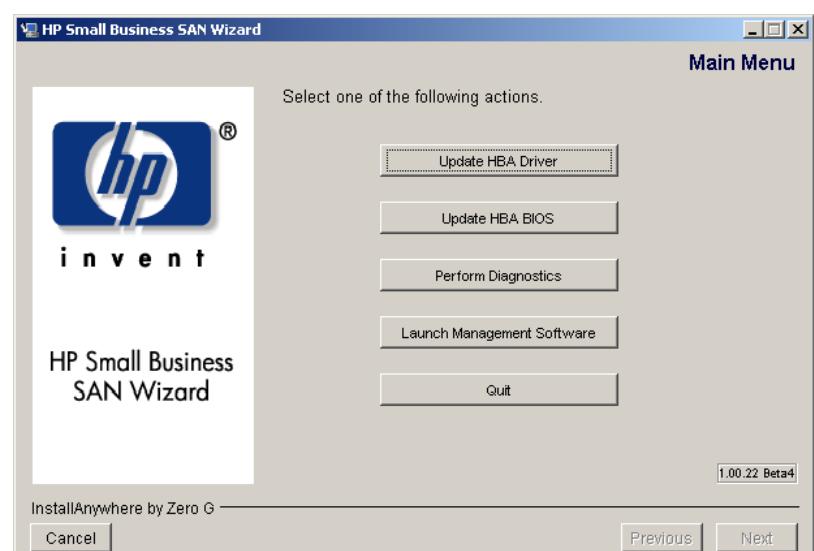


Depending on your selection in the Manage SAN or Configure Logical Drives windows, the Array Configuration Utility, SANsurfer Express, or Small Business SAN Wizard Main Menu is displayed.

**Note:** When configuring the storage, use the following resources:

- Online help
- User guides - provided on the Small Business SAN Documentation CD

The following image is an example of the Small Business SAN Wizard Main Menu, from which you can launch configuration software and perform updating and diagnostics tasks.



8. In the Main Menu, to exit the Wizard, click **Quit**, and remove the Software CD.

9. Repeat these configuration steps on each server in the SAN.

**Note:** During the installation process, icons for the Small Business SAN Wizard, Array Configuration Utility, and/or SANsurfer Express are installed on the desktop, and listings are added to the Start menu.

## Small Business SAN best practices

- Become familiar with the MSA1000 web site. ([www.hp.com/go/msa1000](http://www.hp.com/go/msa1000))

Between manufacturing cycles, updated versions of MSA1000 firmware, HBA drivers, or system documentation may be posted to the web.

Check the web periodically for updates.

- Before installing and connecting your devices, consider protecting your information with redundancies of power, storage, and data paths.

To provide redundant power, be sure to plug the two power supplies on the MSA into separate Uninterruptable Power Supplies (UPS) on separate power sources. If you have only one UPS, maintain separate power paths by plugging one MSA power supply to the UPS on one power source and the other MSA power supply to a separate power source.

To provide redundant storage, configure your arrays using fault-tolerant RAID levels and striping methods.

To provide redundant data paths, include two isolated Fibre Channel fabrics and the associated hardware and software components in the configuration. (For example: two controllers in each MSA1000, two switches, and two HBAs in each server. Multi-pathing and storage configuration software must be installed on each server.)

- After configuring the storage, be sure to:

- Identify the operating system of each HBA with access to the storage.
- Verify that each HBA in each server has been granted access to the storage.
- Control access to the storage by indicating which HBA can access which array.

- When updating HBA drivers, always use drivers and installation scripts provided on MSA Software CDs or the MSA web site.

Your MSA will not operate as intended if you update your HBA driver manually or use drivers obtained from the HBA manufacturer.

- Status, informational, and error messages are sent to and displayed on the LCD panel of the MSA Controller. Use the arrow buttons near the LCD panel to review and erase the messages.

- This Small Business SAN includes basic failover support, used by high availability multi-path configurations.

If a path becomes unavailable, the system automatically fails over to the redundant path. During failover events, information is sent to the system event log and to the controller LCD panel.

For additional information about multi-pathing,

- Go to the MSA1000 web site at <http://www.hp.com/go/msa1000>.
- Go to the High Availability web site at <http://www.hp.com/go/ha>.

- Monitor the status of your SAN by frequently viewing system event logs and LCD panel messages.

## System information

**NOTE:** Information requested in this worksheet is helpful for zoning, multi-pathing, future configuration changes, and troubleshooting.

- Single-path, non-clustered  
 Multi-path, non-clustered

- Single-path, clustered  
 Multi-path, clustered

### MSA1000

MSA1000 Serial number \_\_\_\_\_  
Controller WWNN \_\_\_\_\_  
Controller WWPN \_\_\_\_\_  
Controller firmware version \_\_\_\_\_  
MSA1000 Support Software CD version \_\_\_\_\_  
MSA1000 Small Business SAN CD version \_\_\_\_\_

Storage Enclosures, model & quantity (optional) \_\_\_\_\_

### 2/8q FC Switch

Switch firmware version \_\_\_\_\_  
Switch IP address \_\_\_\_\_  
Switch WWNN \_\_\_\_\_  
Switch WWPN \_\_\_\_\_

### Server

Server make and model \_\_\_\_\_  
Operating system & version \_\_\_\_\_  
Operating system service pack / errata \_\_\_\_\_  
Server name \_\_\_\_\_  
HBA model A7523A Fibre Channel Host Bus Adapter  
HBA slot location \_\_\_\_\_  
HBA driver version \_\_\_\_\_  
HBA firmware version \_\_\_\_\_  
HBA WWNN \_\_\_\_\_  
HBA WWPN \_\_\_\_\_

### Hard Drives

Model and capacity \_\_\_\_\_